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MEMORANDUM

TO: "Asbestos in Soil" Workgroup

FROM: Sarah Weinstein  
Paul Locke

DATE: ~~September 12~~, October 27, 2003

SUBJECT: Conceptual Recommendations

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To build on the Workgroup's meetings in May and June and thoughtful discussion about the issues surrounding the assessment and cleanup of asbestos in soil, we would like to present a "conceptual" proposal for establishing and clarifying standards for dealing with situations involving this contaminant. This memo describes an approach that DEP could take to ensure that situations involving asbestos in soil that are likely to present a significant risk to public health and the environment are reported to DEP, assessed appropriately, and cleaned up adequately.

We have scheduled a Workgroup meeting for ~~September 23~~, October 29, 2003, 9:30-noon in the "~~Commonwealth~~" "~~Berkshire~~" Conference Room on the 2<sup>nd</sup> Floor of DEP's Boston Office at One Winter Street. We hope to get your feedback about this proposal at that meeting.

## 1. Background

Asbestos is an environmental contaminant frequently encountered at previously developed "brownfields" sites. It is highly hazardous to human health when people inhale it. Where there is no route of exposure (e.g., where it is buried at depth in soil or under another type of barrier), it presents low direct risks to public health, although care needs to be taken to ensure that the asbestos will not be brought to the surface by disturbing its cover or by excavation.

Asbestos in the environment most commonly results from two types of human actions: 1) renovation or demolition of buildings that contained asbestos without the benefit of modern removal and management techniques; and 2) disposal of asbestos-containing material at the site, either before today's rules were promulgated (e.g., the Bethlehem Steel landfill in Quincy) or as the result of illegal disposal. Fires at buildings that contained asbestos can release significant quantities of this material into the environment. There are also residues from former commercial asbestos mining operations in several Western Massachusetts towns (Chester, Blandford, Plainfield, and Hinsdale). These mines were located at the

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southern edge of a geologic formation known as the “Talc-Serpentine District”, in which naturally occurring asbestos extends from Western Massachusetts into Vermont. Naturally occurring low levels of asbestos are also found occasionally in other parts of the Commonwealth (e.g., road cuts for I-195 in Southeastern Massachusetts). Due to use of asbestos in building materials, fibers may be found in soil around buildings, either from residuals from construction or from weathering of asbestos-containing materials used on the building’s exterior. In urban areas, most ambient air concentrations range from  $3 \times 10^{-6}$  to  $3 \times 10^{-4}$  f/mL, but may range up to  $3 \times 10^{-3}$  f/mL as a result of local sources (ATSDR, 2001). These ambient levels fall within a risk range of  $10^{-7}$  to  $10^{-5}$  (assuming 24 hour/day, 70-year exposures to those levels). There is very little data available on typical levels of asbestos in soil in urban environments, but one study of street sweepings indicates that the majority of asbestos structures, assumed to be from brake linings, are shorter ( $< 2 \mu\text{m}$ ) than those considered to be of greater human health concern ( $> 5 \mu\text{m}$ ) (ATSDR, 2001).

Building renovations and demolitions involving asbestos are regulated by the U.S. EPA under NESHAP, and by BWP under 310 CMR 7.00. The federal program has been delegated to DEP. Anyone engaging in renovation or demolition work is required to survey the building for asbestos, and notify BWP at least 10 days before work commences if asbestos is present. This provides BWP regional staff the opportunity to review plans and conduct inspections, to ensure that the renovation or demolition work will not create a condition of air pollution. Asbestos removal work must be performed by contractors holding an appropriate license from the MA Dept. of Labor and Workforce Development (Division of Occupational Safety, DOS). The notifications, which are submitted by asbestos contractors (and can now be submitted on-line), satisfy notification requirements of DEP, DOS, and US EPA.

Wastes containing asbestos are regulated by BWP under the solid waste rules, 310 CMR 19.000. In general, waste containing any amount of asbestos must be disposed of as a “special waste”. It must be shipped to a disposal facility with an approval to accept it, and it must be accompanied by a specific shipping document. Section 6 of this memo contains recommendations for modifying this rule for certain soils containing asbestos fibers.

At many construction sites, asbestos is found to have already been released to the environment. In 1987, the Massachusetts Contingency Plan established a “reportable quantity” for asbestos of one pound released in a 24-hour period. However, this “RQ” does not apply to sites where the total quantity released cannot be determined, and the only information available is a site history indicating that asbestos may have been present there in the past and/or analytical data indicating a concentration of asbestos fibers in soil. BWP’s asbestos staff has generally managed cleanups where asbestos is the only contaminant, while BWSC generally has overseen a number of cases where asbestos is mixed with other contaminants (with advice from the BWP asbestos staff).

DEP’s proposal to address asbestos in soil, as presented below, has been substantially modified from an initial proposal that was provided to the Workgroup earlier this year, as a result of discussions within DEP and the external Workgroup meetings. Key features of the revised proposal include:

- New MCP notification criteria for debris containing asbestos;
- New MCP ~~criteria for Limited Removal Actions addressing asbestos~~notification exemptions for relatively intact structures (pipes, boilers) and asbestos fibers in soil;
- Elimination of BWP notification of the active management of asbestos containing material in the MCP;
- Retained BWP notification of the active management of asbestos containing material outside the MCP;

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- Standardized BWP Best Management Practices (BMPs) for active management of asbestos in soil;
- Standardized approach for determine the absence of “chunks” of asbestos containing material;
- Adoption of a risk-based approach to determine “How clean is clean enough?”; and
- New Solid Waste exemption from the definition of “Special Waste” for asbestos fibers in soil.

Figures 1a, 1b and 1c describes the conceptual process for notifying DEP of releases of asbestos in soil, assessing these releases, and cleaning them up where needed.

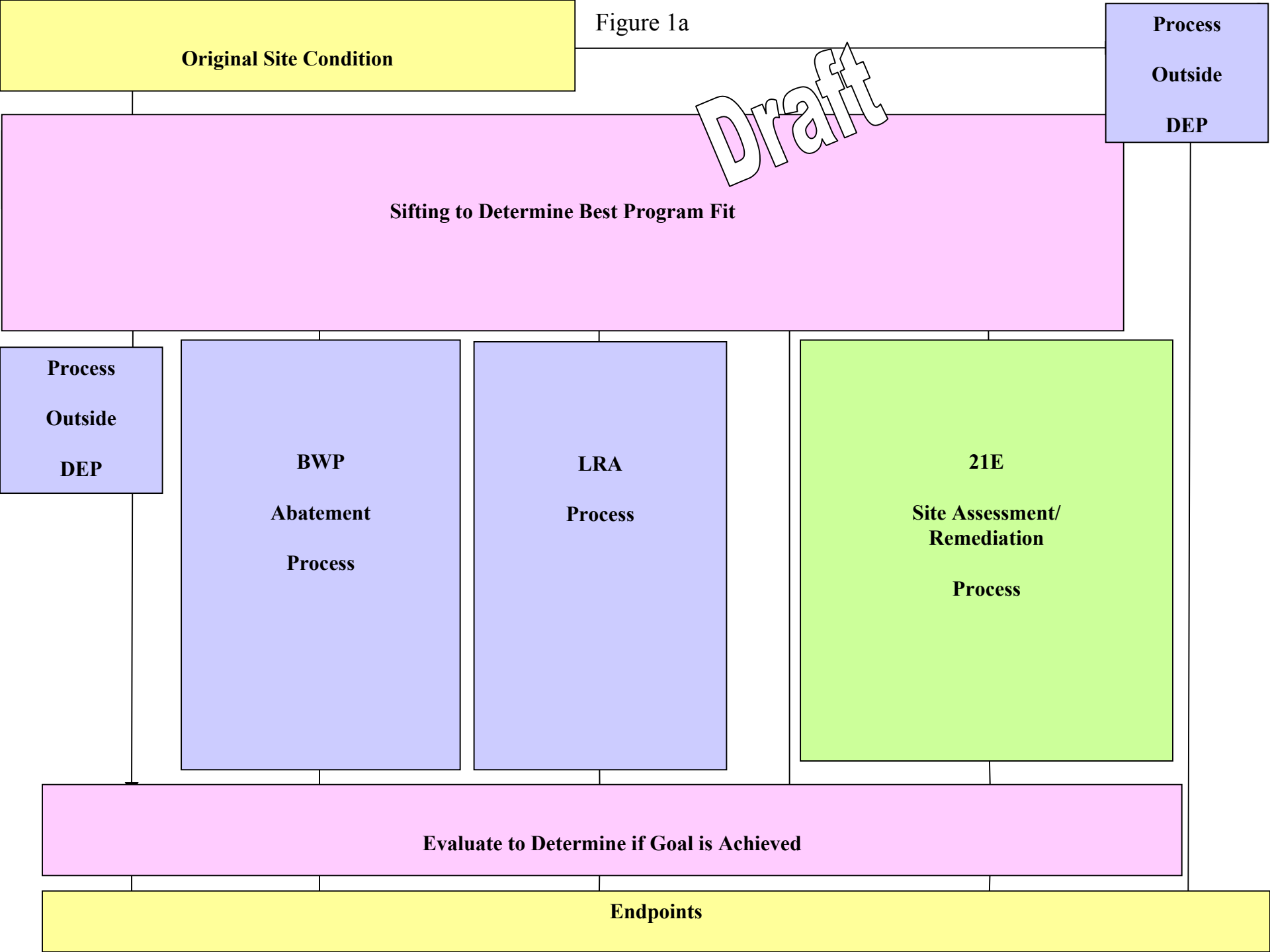
## 2. Recommendations for Notification

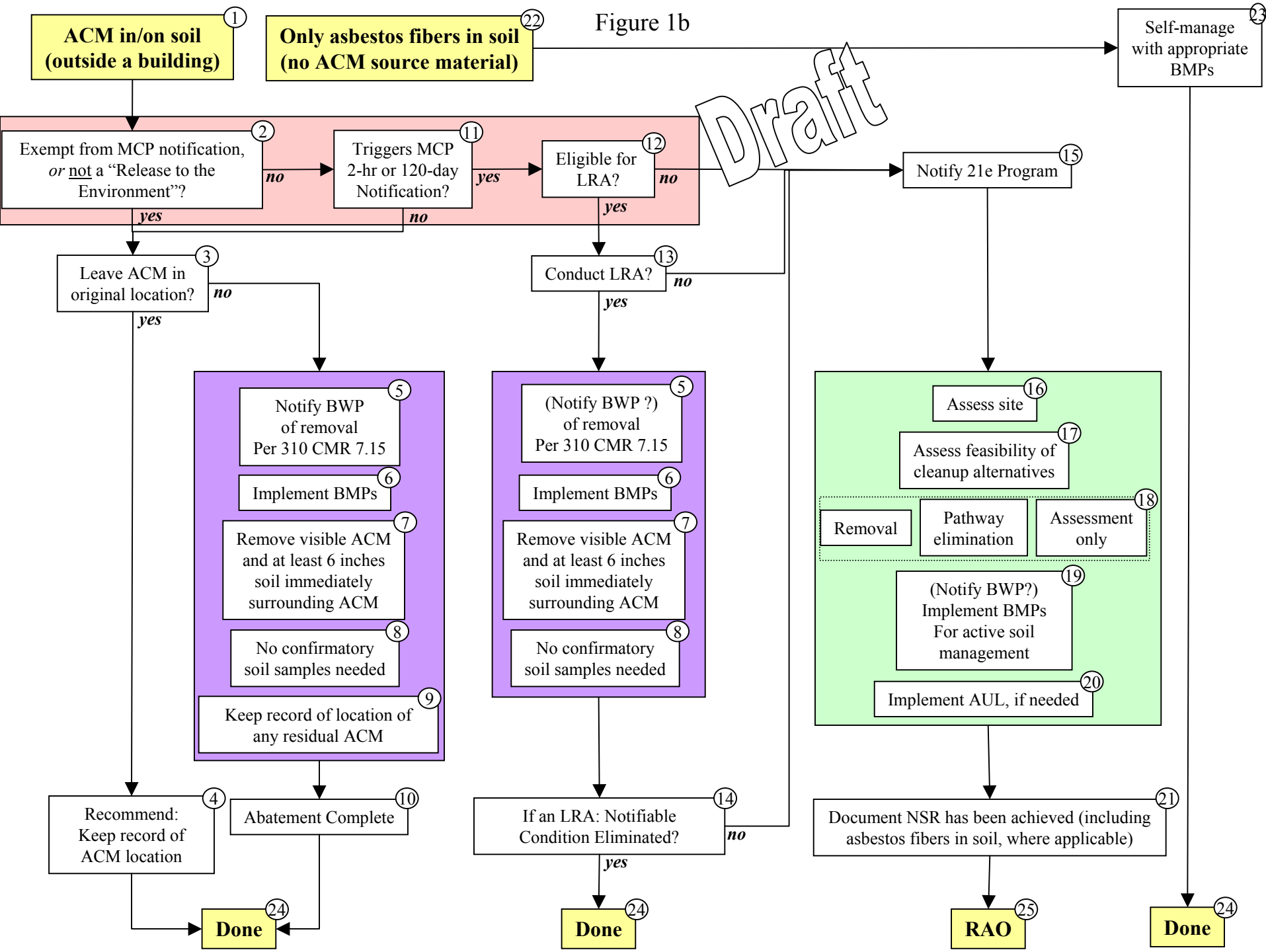
~~Table 1 and~~ Figure 2 summarize the existing and proposed notification requirements described below. The recommendations below are intended to provide clear guidance on when notification to DEP would be required. While this proposal would result in the reporting of more asbestos sites than is currently required by regulation, it does not capture all sites with any level of asbestos. This proposal is consistent with current MCP notification requirements, which requires notification of sites that are likely to pose a significant risk to public health, safety, welfare, or the environment if they remain unaddressed. The workgroup recognizes that the timing and nature of notification is a risk management decision.

- **BWP notification would continue to be required whenever asbestos in soil is going to be excavated or otherwise disturbed by remediation or construction, unless the work is directed by an LSP during an MCP assessment/remediation.** This notification is required under 310 CMR 7.15 and DEP will continue to use existing procedures (e.g., notifications are submitted at least 10 days prior to the start of work unless DEP issues a waiver of the deadline, and would contain the same information that BWP currently receives). This notification allows BWP to insure the safe handling of asbestos-contaminated soil and the implementation of appropriate BMPs, to prevent further releases and the creation of “conditions of air pollution”, in accordance with DEP’s air quality rules and our NESHAP delegation. This requirement satisfies the notification requirements of DOS and the US EPA (for whom BWP acts as the reporting “intake” agency). ~~Once a coordinated BWP/BWSC approach (as outlined below) has been established and all parties have obtained experience with it, BWP may revisit this notification and establish de minimis levels below which these notifications will not be required.~~
- **BWSC should establish notification requirements, consistent with the existing framework of the MCP, for sudden, time critical and historic releases of asbestos to the environment (see below for specific recommendations).** “Asbestos” is already listed as a Hazardous Material under 310 CMR 40.1600, where it is currently defined in the MCP by a CAS number; it is broadly considered to include unconsolidated fibers as well as friable and non-friable debris containing asbestos. Clearer notification requirements for sudden and time-critical releases will initiate the assessment and remediation at sites requiring immediate action. Notification requirements for historical asbestos releases will encourage property owners and developers to improve their pre-construction site investigations. If asbestos in soil is identified as part of a site investigation, its remediation can be planned before construction equipment is mobilized. This should result in fewer “panic” phone calls to DEP and more thoughtful planning for these situations (i.e., we want people to “think before they dig”).

Note that the proposed 120-day notification conditions would allow for the implementation of a Limited Removal Action (LRA) at sites with small quantities of asbestos containing soils ~~(the Workgroup has proposed increasing the LRA volume for asbestos contaminated soils from 20-yd<sup>3</sup> to 30-yd<sup>3</sup> or more)(20 yd<sup>3</sup>)~~ to eliminate the need for notification under the MCP. Any excavation

Figure 1a





## Sifting to Determine Best Program Fit (Boxes 2, 11 & 12)

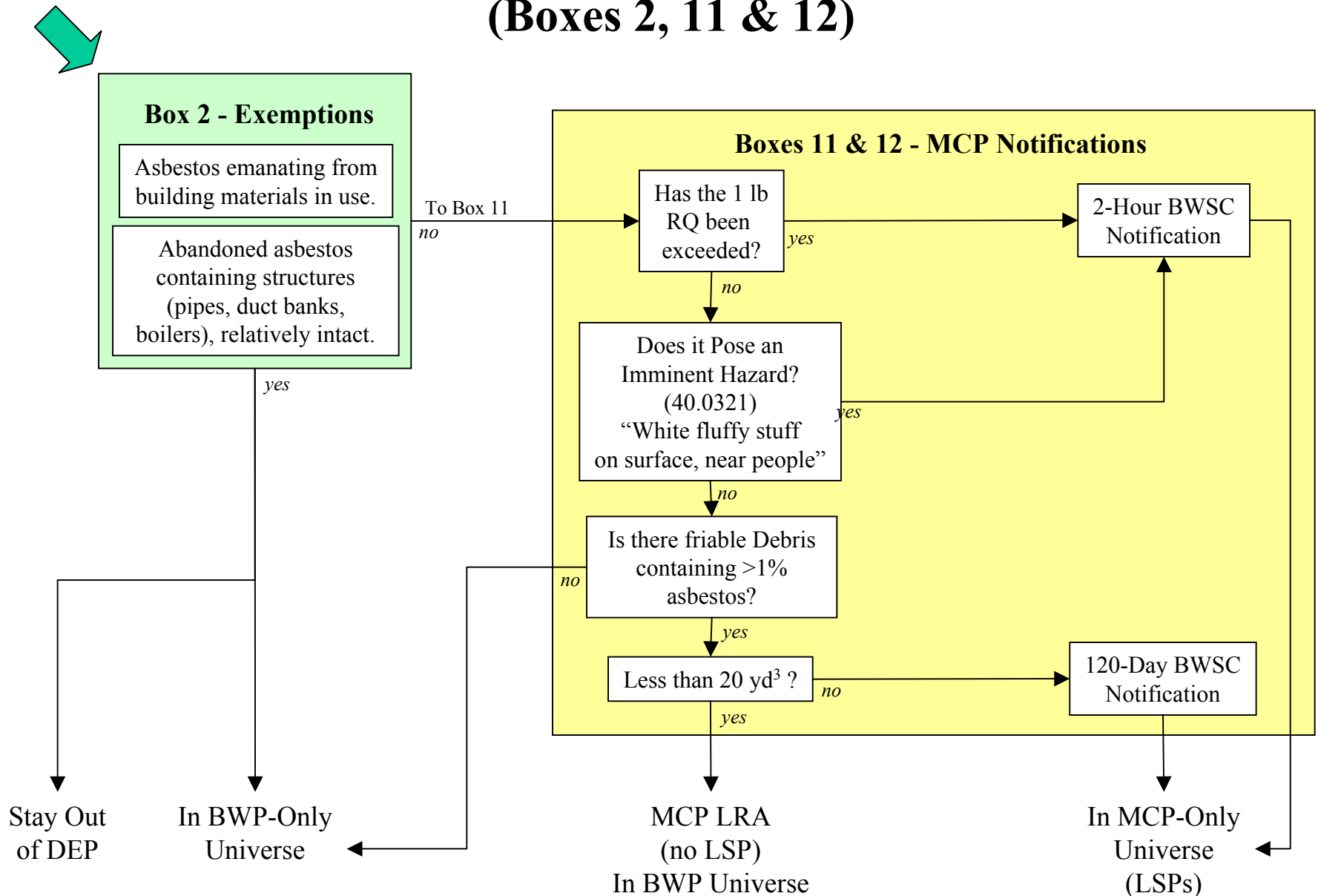
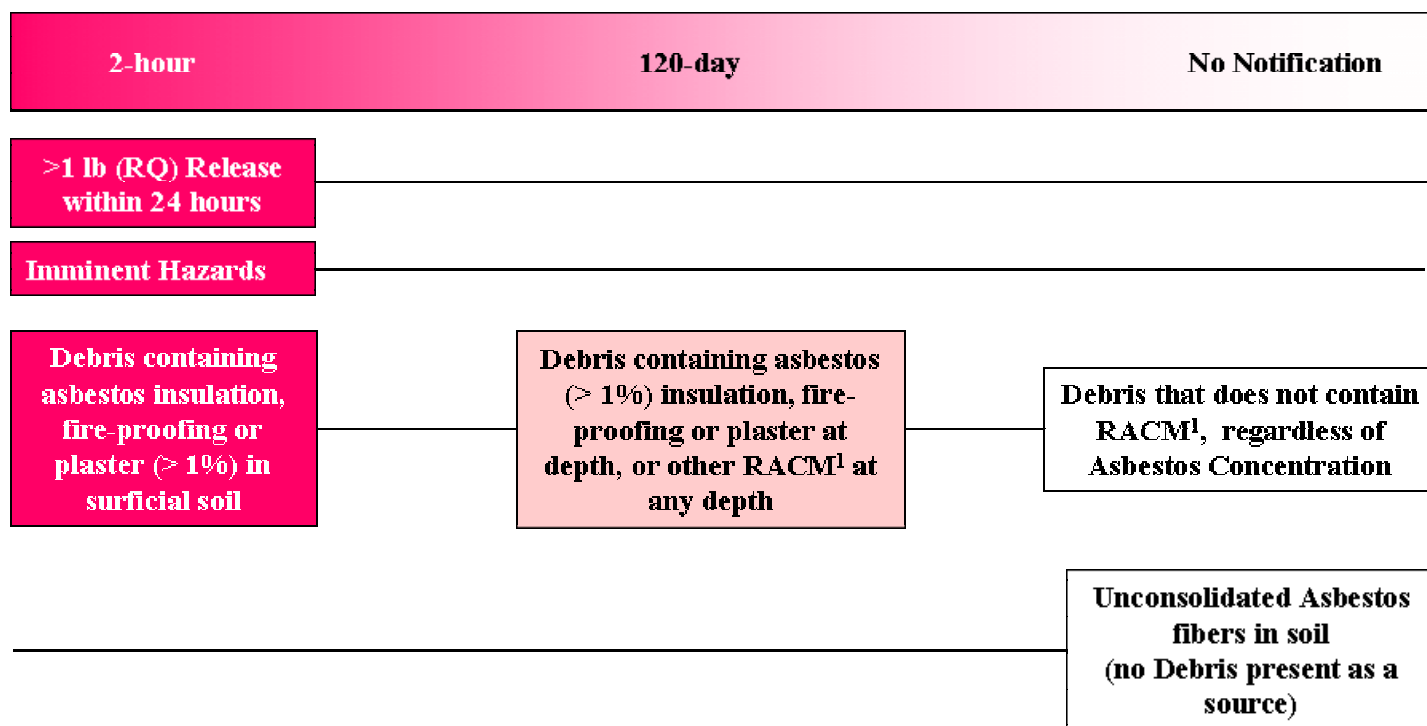


Figure 2

## Proposed MCP Notification Requirements Applicable to Asbestos



<sup>1</sup> RACM ("Regulated Asbestos-Containing Material") is (a) friable asbestos material (e.g., thermal, fire-proofing or acoustic insulation), (b) Category I non-friable ACM (e.g., gaskets, resilient floor covering or asphalt roofing product) that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (d) Category II non-friable ACM (cementitious pipe, shingles, roof tiles) that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material... (EPA-340/1-90-018)

and management of asbestos contaminated soil that is part of an LRA would include notification of BWP.

We propose the following MCP notification requirements specific to asbestos:

- ~~The existing 2-hour reporting requirement for releases of any oil or hazardous material (including asbestos), at any concentration, that pose an Imminent Hazard [310 CMR 40.0321(1)(d)] should be retained.~~
- The existing 2-hour reporting requirement for any sudden release of asbestos (such as during improper building demolition) that exceeds the Reportable Quantity of one pound (310 CMR 40.0311) should be retained. New guidance should clarify how that the one-pound criterion applies to asbestos and not the weight of the Asbestos Containing Material (ACM), which is the most common form in which asbestos is released into the environment. The RQ is intended to address sudden releases of asbestos, not ACM.
- A new 2-hour reporting requirement should be established for certain types of Debris<sup>1</sup> containing more hazardous forms of asbestos at concentrations equal to or greater than 1% found on ~~or in surficial soil (0-1' below grade)-the soil surface.~~ The forms of asbestos covered by this requirement ~~should will~~ be limited to materials that readily release asbestos fibers to the surrounding environment, such as asbestos-containing insulating materials, spray on fireproofing, and plaster. The combination of high exposure potential and likelihood of airborne asbestos fibers is a combination that *could* pose an Imminent Hazard, similar to existing requirements [310 CMR 40.0321(2)(b)] for other hazardous materials. This reporting threshold would also apply to Debris containing these materials that is uncovered (made surficial) during an excavation. BWP will prepare a list of the specific materials and types of asbestos to be covered.

A 2-hour report is appropriate because these conditions have the potential to pose the highest hazard to public health from asbestos in soil, where it is most likely to become airborne and reach receptors. As with any 2-hour notification under the MCP, an Immediate Response Action (IRA) would be conducted to identify and implement any action needed to prevent exposure to surficial asbestos (e.g., removal or cover).
- A new 120-day reporting requirement should be established for Debris containing certain hazardous forms of asbestos at concentrations equal to or greater than 1% found ~~at depths greater than 1 foot below grade-below the ground surface.~~ The forms of asbestos covered by this requirement should be limited to materials that readily release asbestos fibers to the surrounding environment, such as friable asbestos-containing insulating materials, spray on fireproofing, and plaster. In general, these materials would be the same as those listed in the bullet above.
- A new 120-day reporting requirement should be established for other friable Debris containing asbestos at a concentration equal to or greater than 1% and located at any depth, including material that was originally non-friable but which has become friable due to the actions of weathering, demolition or other forces. The forms of asbestos

<sup>1</sup> "Debris" is used in this proposal as it is already defined in the MCP (310 CMR 40.0006). To summarize, "Debris" means solid material that is a manufactured object, plant or animal matter that is intended for disposal or is otherwise no longer serving its intended use, including demolition and construction waste.



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covered by this requirement would be consistent with the federal definition of “Regulated Asbestos Containing Material” (“RACM”)<sup>2</sup>, such as roof tiles, shingles, pipe, roofing felts, caulking putties and stucco that have become friable or ~~are likely to become friable-pulverized.~~

- No MCP notification is proposed for asbestos if the site conditions do not otherwise pose an Imminent Hazard, and
  - asbestos is present at the site only in the form of unconsolidated fibers in soil (with no identifiable source);
  - the concentration of asbestos in friable or non-friable Debris at the site is less than 1%, regardless of depth and location;
  - asbestos is present in non-friable Debris ~~that is likely to remain non-friable.~~

In general, asbestos in a truly nonfriable matrix is considered to pose less of a risk than friable asbestos. However, DEP recognizes that, with exposure to weather over time, nonfriable matrices can deteriorate and become friable, or can decompose so that a mixture of unconfined asbestos fibers and debris is present in the environment. In practice, this approach may bring ~~most much of the~~ ACM found in the environment into the 21E system (even if it started out as non-friable), because once it has been dumped in the environment, breakage during dumping and weathering over time starts to break up most ACM matrices, and fibers are released. U. S. EPA has established definitions and procedures (RACM) for determining if a material is of regulatory concern due to its current condition, regardless of the friability of the original source material. However, EPA’s criteria do not establish “bright lines”, and implementation requires that subjective decisions must be made in the field. In order to clarify and standardize the MCP notification requirements, we propose to reference specific materials (e.g., acoustic insulation) as much as possible. We could also use EPA’s published definitions to catch remaining situations of concern ~~(please note that we are still working on the exact language)-(the proposed MCP definitions for “Releasable Asbestos Containing Debris” closely parallels the EPA RACM definition).~~

Please also note that the MCP requires notification decisions to be made based on current conditions at the site (in terms of potential for exposure). A site may not need to be reported based on current activities that are taking place there (e.g., it is undeveloped and access is restricted, or it is the location of older buildings that were demolished some time ago and have not been redeveloped). However, if site uses change so that people can be exposed to detected contamination, there may be a reporting obligation. Most owners who have concrete plans for redeveloping their property consider the new activities and uses when they make their reporting decisions. Low levels of contamination at property for which there are no development plans can remain unreported as long as site conditions do not change.

The recommendation not to require notification based on unconsolidated asbestos fibers in soil is based on a detailed review of the available analytical methods for asbestos in soil, which confirms that, at the present time, there is no standard analytical method available to reliably quantify asbestos fibers in a soil

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<sup>2</sup> RACM (“Regulated Asbestos-Containing Material”) is (a) friable asbestos material (e.g., thermal, fire-proofing or acoustic insulation), (b) Category I non-friable ACM (e.g., gaskets, resilient floor covering or asphalt roofing product) that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (d) Category II non-friable ACM (cementitious pipe, shingles, roof tiles, transite board) that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material...(EPA-340/1-90-018)

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matrix. The currently available approaches can determine whether asbestos fibers are “present” or “not present” in the sample. Notification criteria based on “present”/“not present” results would be very crude measures of the potential risk posed by the site. We recommend that DEP not propose notification criteria for asbestos fibers in soil at the current time because (a) the analytical methods cannot differentiate between high and low risk sites; (b) most asbestos sites that have come to DEP’s attention include at least some Debris containing asbestos that would otherwise trip a new notification requirement; and (c) data from the US EPA elutriator method indicate that asbestos fibers in soil alone (without source debris) may pose low-to-moderate health risks; and (d) the existing notification requirement for Imminent Hazards can be used to address sites not otherwise captured by the proposed criteria. As US EPA and ASTM develop more analytical methods specific to asbestos fibers in soil, we recommend that DEP revisit this issue.

### 3. Recommendations for Case Management

- ~~Relatively small, confined releases of Debris containing asbestos will~~Abandoned pipes, boilers, duct banks, etc., that are relatively intact will continue to be managed under the BWP 10-day notification and BMPs, ~~as long as removal occurs within 120 days of discovery (taking advantage of expanded LRA provisions for asbestos), regardless of the volume of material being addressed.~~
- ~~“Historical” asbestos releases~~Asbestos in Debris exceeding LRA limits would be managed under the MCP. LSPs would provide Waste Site Cleanup Opinions to ensure that assessments and remediation meet the MCP’s requirements (see Section 4 below). Management of asbestos contaminated soil under the MCP would not require the BWP 10-day notification, but may trigger USEPA and MADOS notifications. BWP BMPs would be implemented, as appropriate. LSPs would need to rely on asbestos consultants and contractors licensed by the Division of Occupational Safety, who would continue to provide the same services that they do today. Over time, we expect that the 21E program’s incentives for adequate work and the oversight/management provided by LSPs will improve the quality of work performed by licensed asbestos contractors and consultants in these situations.
- ~~As noted above, BWP would continue to receive notifications of active management of asbestos in soil, to provide the opportunity to ensure that excavation and other activities do not create conditions of air pollution.~~ BWP is developing a standard set of “Best Management Practices” that would be available to guide active handling of asbestos in soil. BWP will continue to use all the compliance and enforcement tools that it currently has to ensure that asbestos in soil is properly handled.
- BWSC staff would audit reports involving asbestos contamination as they currently do for other contaminants. During a transition period (to be defined through further inter-Bureau discussions), BWP asbestos staff will provide technical assistance for these audits, and should have any site inspections they perform count toward BWSC’s audit requirements (as well as counting toward BWP’s inspection targets).
- BWP would retain its existing authority to pursue enforcement actions for improper demolition or renovation involving ACM that result in releases of asbestos into the environment (under 310 CMR 7.00), and for improper/illegal disposal of C&D debris (under 310 CMR 19.000). Where these problems are found, responsible parties and property owners will be ordered to remove debris containing ACM with short deadlines, and to remove all improperly disposed debris, visible asbestos and ACM. If confirmatory sampling indicates

the continued presence of asbestos in soil, then the site may be turned over to the 21E program to ensure that the cleanup meets the “no significant risk” standards (see Section 4 below). If a site where C&D debris has been found to be improperly disposed of is being addressed under the Solid Waste Regulations (310 CMR 19.000), then DEP may consider it to be “Adequately Regulated” for MCP purposes, and would not require LSP Opinions, etc.). As above, the same cleanup decision guidelines that would apply under the MCP would be used at these “Adequately Regulated” sites.

#### 4. Recommendations for Cleanup Decisions (“How Clean is Clean Enough?”)

- Debris containing asbestos at a concentration equal to or greater than 1% in accessible soil (0-3 feet, unpaved) should be defined in the MCP as a “source of asbestos to ambient air”, triggering the existing requirement [310 CMR 40.1003(5)] to eliminate or control each source of OHM in order to achieve a Permanent Solution. An AUL would be required for Debris containing asbestos at a concentration equal to or greater than 1% in soil at depth (deeper than 3 feet) to prevent the asbestos from becoming a source to ambient air.
- A risk-based approach should be used to make “how clean is clean enough” decisions for sites involving asbestos in soil under the MCP Method 3 risk characterization rules. The MCP approach includes the use of measures to eliminate potential exposure (such as a cap), as well as those that reduce environmental concentrations (such as removal and disposal).
- Asbestos in soil along utility lines is considered to have potential for exposure via current uses (e.g., utility repairs, foundation work, exposure to construction workers).
- Low levels of asbestos fibers can remain in some soil matrices without a barrier and AUL where it can be demonstrated that the asbestos presents an insignificant exposure (and therefore an insignificant risk) because its disturbance would not release enough fibers into the air to reach receptors. A decision to leave such low levels of asbestos in soil without a barrier to exposure must be based on a demonstration that the risks are truly insignificant, based on one of the methods described in Figure 3.

DEP is developing guidance for this demonstration, which would include several analytical options, including the use of DEP’s “dust generation” model, EPA’s “Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Materials” (i.e., the “Tumbler Method”), or performance of a site-specific pilot study (See Figure 3). The MCP compliance concentration for demonstration of “No Significant Risk” for residential exposures would require risks to be reduced below a range of  $1 \times 10^{-5}$  to  $1 \times 10^{-6}$ , or 0.00004-0.0004 structures/cm<sup>3</sup> in the ambient air. The demonstration would need to address both “on-site” and “off-site” receptors that could be affected by airborne asbestos.

- At sites where notification is not currently required, remediation may still be necessary to eliminate a Significant Risk, pursuant to 310 CMR 40.0370. While such response actions would be conducted without the submittal requirements, approvals and fees of the MCP, management of the contaminated soil would still be subject to any applicable BWP requirements.

We recommend that DEP make a significant effort to educate LSPs, asbestos contractors, and their clients about these requirements. We expect that DEP will follow up with audits and possibly enforcement actions where asbestos contamination is inappropriately “risked away”. Implementation

Figure 3

## **Options for Demonstrating “No Significant Risk” (NSR) for Closure Under the MCP**

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Eliminate/Control All “Continuing Sources”, and Demonstrate One (or a Combination) of the Following Conditions:

- 1. Achieve “non-detect” levels of asbestos in soil**
  - No “chunks” of ACM
  - PLM with some percentage TEM confirmatory samples
- 2. Achieve “background” levels of asbestos in soil**
  - Site-specific background would be determined
- 3. Eliminate exposure pathways**
  - Cover with paving, cap or building
  - Cover with 3 feet clean soil
- 4. Demonstrate NSR using a quantitative risk assessment**
  - Superfund (Elutriator) Method to measure asbestos in respirable dust, combined with estimates/model of respirable dust concentration in air
$$\text{Risk} = [\text{Asbestos}]_{\text{PM}_{10}} \times [\text{PM}_{10}]_{\text{air}} \times \text{Inhalation Exposure} \times \text{Unit Risk}_{\text{asbestos}}$$
- 5. Demonstrate NSR using another site-specific approach**

discussions (see below) should focus on a significant DEP education and audit/enforcement through a transition period, as resources allow, to ensure that PRPs, LSPs and asbestos contractors are using the guidelines appropriately.

## 5. Analytical Methods for Site Assessment and Risk Characterization

- To account for the variability of asbestos distribution in soil matrices, assessments should rely on an adequate number of samples, especially in relatively heterogeneous matrices (to meet data quality objectives), or rely upon methods that incorporate large volumes of soil per sample.
- No standard analytical method exists for measuring asbestos fibers in soil. Typically, methods designed for measuring asbestos in bulk material have been applied to the soil matrix, although the resulting data has been characterized as unreliable and not representative. It has been reported that some laboratories will now report asbestos as being “present” or “not present” in soil using these methods. Levels detected below 1% may also be reported by labs as traces.

Both PLM and TEM can be used to analyze soil samples to determine the nature and extent of asbestos contamination (MCP Phases I and II), but are inadequate for use in a quantitative risk assessment. TEM identifies a variety of fiber types, including smaller and/or narrower fibers that may not be seen with PLM, due to increased magnification. Using the site’s history and potential for human exposure as a guide, some portion of samples determined to be ND by PLM should be analyzed with TEM.

- The “Modified Elutriator Method for the Determination of Asbestos in Soils and Bulk Materials” (or “*Superfund Method*”) is designed to measure the expected amount of asbestos released to the air in respirable dust from asbestos-contaminated soil. The results are measured in air (not soil), relying upon standard and accepted protocols. Since the results are directly applicable to the exposure pathway of concern (the inhalation route), they may be used in combination with estimates of dust generation to quantify potential risk.
  - This Method is currently being used to inform DEP decisions at the MDC North Point Park project and CA/T soil stockpiles.

## 6. Disposal of Excavated Soil Containing Asbestos: “Special Waste” Exemption

Disposal options (or lack thereof) for soil containing low levels of asbestos fibers has been identified as a significant issue by the external workgroup. DEP currently defines soil containing any quantity of asbestos as a “Special Waste” under 310 CMR 19.00, with three exceptions:

- 310 CMR 19.061(6)(b)3. Requirements for certain classes of asbestos wastes. The following asbestos wastes are not subject to the provisions of 310 CMR 19.061 except as specified at 310 CMR 19.061(6)(b)1.a.:
- a. vinyl asbestos tile (VAT);
  - b. asphaltic asbestos-containing materials such as roofing felts, roofing shingles and asphalt siding products (Note: This does not include other asbestos containing roofing shingles and siding products such as those containing a cementitious binding characterized as being hard and brittle.); and
  - c. other asbestos waste designated by the Department.

We recommend that DEP's Solid Waste program add a fourth criterion to the asbestos waste exemptions to allow soil containing some *de minimis* levels of asbestos fibers to be accepted by in-state landfills as solid (not "special") waste. Conceptually, a framework would be developed to allow soil containing some unconsolidated asbestos fibers to be used as shaping/grading material at landfills, to be used as daily cover, or to be disposed of in the landfill. DEP would publish sampling protocols to document that soil directed to landfills for use/disposal meets allowable levels of asbestos fibers and is acceptably free of asbestos "chunks".

The necessary changes to the solid waste regulations would be promulgated concurrently with the proposed "Wave 2" changes to the MCP. Such a change does not guarantee that landfills will accept this material, but it would be within their operating permit to do so without further DEP approval.

## 7. Implementation

- The MCP needs to be amended to establish the recommended reporting requirements. ([See attached](#))
- The solid waste regulations (310 CMR 19.000) need to be amended to exempt low levels of unconsolidated asbestos fibers in soil from the definition of "Special Waste".
- As part of the regulation development process, the project managers should present the issues and recommendations to the Waste Site Cleanup Advisory Committee and Solid Waste Advisory Committee, and obtain feedback.
- Guidance on risk assessment (including use of analytical methods to demonstrate NSR where low levels of asbestos will remain at a site in surficial soil, and a generic concentration below which an AUL would not be required), sampling and use of analytical techniques, and BMPs for excavation/storage/transport of asbestos in soil need to be finalized. Drafts should be available for public review with the proposed MCP and solid waste amendments.
- Coordination protocols between regional BWP asbestos staff and BWSC staff who receive notifications, and plans for RAMs and IRAs need to be developed, to ensure that BWP has a means to ensure that it is receiving proper notifications of active site work involving asbestos in soil, and BWSC can check to ensure that releases are being reported.
- As promulgation of the MCP and solid waste amendments approaches, a communications strategy should be developed to inform LSPs, asbestos contractors and consultants, and the development community of the new rules, BMPs and other guidance.
- Once the communications strategy is implemented, compliance inspections/audits and follow up enforcement where necessary should be undertaken (with publicity for enforcement actions).

Flowchart:

Box	Description
1.	<u>ACM in/on soil (outside a building)</u> The asbestos in soil proposal does not apply to soil in the interior of a building, such as crawl space or dirt floor. Asbestos in interior soils would be governed by BWP in accordance with 310 CMR 7.15. Due to the different exposure scenario, BWP may require confirmatory sampling of interior dirt floors as part of asbestos abatement.
2.	<u>Exempt from MCP notification or not a “release to the environment”</u> The statute (21E) and regulations (MCP) already exempt asbestos emanating from building materials still serving their intended purpose. Proposed changes to the regulation will specifically exempt from notification (310 CMR 40.0317) large, relatively intact ACM that would be handled as an “abatement” via 310 CMR 7.15. These ACM would include buried asbestos-containing pipes, ducts, or other building materials that are discrete and not “spread around.” If a property is a 21E site for other reasons, the PRP may choose to fold such ACM removals into the 21E cleanup.
3.	<u>Leave ACM in original location?</u> BWP recognizes that leaving in place buried ACM pipes, ducts, or other historic building debris that are discrete and not “spread around” may be the best option for avoiding asbestos releases and potential exposure.  Note, however, that removal of ACM debris that was illegally disposed may be required as part of an enforcement action.
4.	<u>Keep record of ACM location</u> If ACM is left in place, owners should keep records of the location of the ACM to the extent known.
5.	<u>Notify BWP of removal per 310 CMR 7.15</u> If abatement or removal is planned for ACM not subject to the MCP or for ACM being removed as an LRA, owners should notify BWP in accordance with 310 CMR 7.15. Provided that all visible pieces of ACM are removed along with immediately surrounding soil (i.e., 6”), BWP would not require confirmatory soil sampling to close out the abatement or LRA.
6.	<u>Implement BMPs</u> BWP will publish guidance on BMPs that should be implemented for removal of ACM in soils.

7. Remove visible ACM and at least 6 inches soil immediately surrounding ACM.  
The goal of the abatement is to remove the visible ACM. Removal of a layer of potentially contaminated soil from around the ACM will also eliminate small chunks and/or asbestos fibers that have been shed from the ACM.
8. No confirmatory samples needed.  
Assuming that the soil immediately surrounding the ACM has also been removed, it can be assumed that all the asbestos of concern has been eliminated.
9. Keep record of location of any residual ACM  
BWP recognizes that the scope of ACM removal may not include removal of all ACM. For example, a section of abandoned ACM pipe that is removed to allow for construction or utility repair/upgrade would not require that the entire abandoned pipe be removed. When ACM is left in place, owners should keep records of the ACM location to the extent known.  
  
It is important to note that if the ACM left in place meets the NESHAP definition of RACM (e.g., burst transite asbestos pipes) and exceeds NESHAP threshold amounts (i.e., at least 260 linear feet of RACM on pipes, or 160 square feet of RACM on other facility components, or at least 35 cubic feet of facility components where the amount of RACM could not be measured), leaving the RACM in place would subject the site to the NESHAP requirements for active and/or inactive disposal sites.
10. Abatement Complete  
Proper removal of visible ACM and immediately surrounding soil would meet the standards established by 310 CMR 7.15.
11. Triggers MCP 2-hr or 120-day Notification?  
MCP notification criteria will be developed to focus on (a) ACM that is not intact, (b) ACM that has been scattered over a wide area, and (c) ACM that is friable. Some material, because of its size, condition and/or location, will not trigger notification.
12. Eligible for LRA?  
If site conditions have triggered 120-day notification, a Limited Removal Action (LRA) may be appropriate. Under current regulations, up to 20 yd<sup>3</sup> of soil contaminated by a hazardous material such as asbestos could be removed. This volume could be increased for asbestos.
13. Conduct LRA?  
LRA's are not required, and there may be reasons to conduct the removal of asbestos under the MCP.



14. Notifiable Condition Eliminated?

The goal for an LRA is the elimination of the condition that triggered notification. If the 120-day notification condition still exists following soil removal, then notification is required.

15. Notify 21E Program

Notification following identification of a 2-hour or 120-day notification condition. A Release Tracking Number (RTN) will be assigned and timelines begun. The following steps (16-21) are intended as a summary of the standard MCP process, which would apply to asbestos sites. Lack of detail in this summary should not be interpreted to limit standard MCP practices.

16. Asses Site

Determine the extent of contamination. While notification may have been triggered by a specific condition, the site assessment should consider all oil or hazardous material likely to be present, based on site history, etc.

17. Assess feasibility of cleanup alternatives

If it is determined that the site does (or would) pose a significant risk of harm, then remediation is indicated. Since there is no appropriate treatment/destruction alternative for asbestos, it is likely that the feasibility of removal or exposure pathway elimination (or some combination) would be weighed.

18. Removal, Pathway Elimination, Assessment Only

“Assessment Only” is included here just to emphasize that some 21e assessments do not result in remediation (i.e., a Class B RAO may be indicated).

19. (Notify BWP?) Implement BMPs for Active Soil Management

BWP will publish guidance on BMPs that should be implemented for removal of ACM in soils.

Submittal of an IRA Plan, RAM Plan or Remedy Implementation Plan can also cover the BWP requirement to notify DEP. However, active management of soil contaminated with asbestos may also require notification to both USEPA and MA DOS -- notifications that are currently transmitted by DEP following a single notification to the BWP asbestos program.

20. Implement AUL, if needed.

If some limitation on the use of the site (i.e., pathway elimination) to eliminate risk, then an Activity and Use Limitation (AUL) would be required.

It is important to note that if the ACM left in place meets the NESHAP definition of RACM (e.g., burst transite asbestos pipes) and exceeds NESHAP threshold amounts (i.e., at least 260 linear feet of RACM on pipes, or 160 square feet of RACM on other facility components, or at least 35 cubic feet of facility components where the amount of RACM could not be measured), leaving the RACM in place would subject the site to the NESHAP requirements for active and/or inactive disposal sites.

21. Document NSR exists or has been achieved (including asbestos fibers in soil, where applicable)

The documentation may include (but is not limited to) a demonstration that exposure has been eliminated, that the residual asbestos poses NSR, or that the asbestos is at background levels.

22. Asbestos Fibers in Soil With No Source Material

“Background” asbestos fibers in soil would not be a notifiable condition under the MCP. In addition, since BWP 7.15 regulations address facilities and facility components, no notification to BWP would be required to manage the soil.

However, owners/operators should consider the use of BMPs for managing such soil (e.g., minimize dust, do not reuse as surficial soil, etc.). Please note that there are situations where just fibers should be notifiable under 21E. These situations include concentrations of fibers at former asbestos manufacturing sites or where a known ACM source of the fibers is identified.

24. Done

While the property is not “clean”, no additional assessment or remediation is required at this time. Future work at the site may require that the remaining asbestos be addressed appropriately.

25. RAO

The site has reached an endpoint under the MCP, which could include Class A, B or C RAOs. The RAO may qualify the site for liability relief under the Brownfields Act.

## **Proposed Asbestos-Related Changes to the MCP**

**NOTE TO REVIEWERS:** *The following changes are proposed to clarify the notification and cleanup requirements for asbestos fibers in soil and asbestos in Debris.*

*Issue: When asbestos concentration is expressed as a percent, MADEP is proposing not to specify whether it is %-weight or %-area for notification purposes, so that either result would trigger notification. In addition, no analytical method is specified, so results from any appropriate method may be used to determine notification requirements.*

*Issue: The terms “friable” and “nonfriable” are used to, in part, determine notification requirements. Definitions are proposed that mirror the federal NESHAPS definitions, modified slightly to reflect the differences between site assessment/remediation and abatement. Should the MCP define new descriptive terms to distinguish between material that has (or may) release asbestos fibers and material that is unlikely to release such fibers?*

*The notification triggers include:*

- *2-hour notification requirement for specific kinds of friable asbestos in surficial soil near residences, schools, playgrounds and parks (40.0321); and*
- *120-day notification requirement for asbestos in Debris (40.0315).*

*Specific notification exemptions include:*

- *asbestos fibers in soil, absent a known/suspected manufacturing source; and*
- *abandoned structures containing asbestos that are best dealt with as an abatement project.*

*The sections related to cleanup requirements include:*

- *Detailing that asbestos does not have an Upper Concentration Limit in Soil or Groundwater (40.0996); and*
- *Defining Debris comprised of material containing asbestos at concentrations greater than 1% in surficial soil to be a source to ambient air (40.1003).*

### **MCP Requirements for Notification and Cleanup of Asbestos**

#### **1. Definitions**

##### **A. Current – None specific to asbestos**

##### **B. Proposed**

###### **i. Friable Asbestos Containing Debris**

means Debris comprised of any material containing more than 1 percent asbestos that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

###### **ii. Nonfriable Asbestos Containing Debris**

means Debris comprised of any material containing more than 1 percent asbestos that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

###### **iii. Releasable Asbestos Containing Debris (RACD)**

means (a) Friable Asbestos-Containing Debris, (b) Nonfriable Asbestos Containing Debris that has become friable, or (c) Nonfriable Asbestos

Containing Debris that has become crumbled, pulverized, or reduced to powder.

## **2. Exemptions**

### **A. Current**

- i. 310 CMR 40.0006, Definition of “Disposal Site”  
Disposal site means.... The term shall not include any site containing only oil or hazardous materials which: are building materials still serving their original intended use or emanating from such use...
- ii. 310 CMR 40.0317(12), 120-day Notification Exemptions  
releases of oil and/or hazardous material resulting or emanating from:....  
(e) building materials that are in good repair and still serving their original intended use;

### **B. Proposed - 310 CMR 40.0317, 120-day Notification Exemptions**

- i. releases of asbestos from abandoned asbestos-containing structures, such as pipes, boilers or duct banks, that are intact or substantially intact. For the purposes of this section, “substantially intact” shall mean that the original structure remains recognizable and that visible asbestos-containing debris from the structure has not been dispersed more than one foot from the original structure.
- ii. releases indicated solely by the presence of unconsolidated asbestos fibers in soils, provided that the source of the asbestos fibers is not known or likely to be a manufacturing waste material.

## **3. 2-Hour Notification Requirements**

### **A. Current**

- i. **Imminent Hazards - 310 CMR 40.0321(1)(d)**  
a release to the environment of oil and/or hazardous material which poses a significant risk to human health when present for even a short period of time, as specified in 310 CMR 40.0950;
- ii. **Sudden Releases – 310 CMR 40.0311**  
Asbestos Reportable Quantity = 1 pound

### **B. Proposed: Conditions Which Pose or Could Pose an Imminent Hazard – 310 CMR 40.0321**

a release to the environment indicated by the presence of more than 1 cubic foot or 1 pound of Friable Asbestos Containing Debris consisting of insulation, fire-proofing or plaster at the ground surface at any location within 500 feet of an occupied building, playground, recreation area or park.

## **4. 120-Day Notification Requirements (310 CMR 40.0315)**

**A. Current – None for asbestos**

**B. Proposed: Friable Debris Not Posing an Imminent Hazard**

a release to the environment indicated by the presence of Releasable Asbestos Containing Debris at the ground surface or mixed in subsurface soil, except where a 2-hour notification is required pursuant to 310 CMR 40.0321;

**5. Upper Concentration Limits (UCLs)**

40.0996: Method 3 Upper Concentration Limits

...

(8) Except as specified in 310 CMR 40.0996(8)(c), fFor any oil or hazardous material not listed at 310 CMR 40.0996(7), either a default or chemical-specific Upper Concentration Limit must be used.

(a) The default Upper Concentration Limit in Groundwater shall be 10,000 µg/L and the default Upper Concentration Limit in Soil shall be 1,000 µg/g.

(b) The chemical-specific Upper Concentration Limits shall be calculated using the methodology presented at 310 CMR 40.0983 and 310 CMR 40.0984.

1. The Upper Concentration Limit in Groundwater shall be equal to ten times the highest groundwater standard calculated at 310 CMR 40.0983 or 100,000 µg/L, whichever is lower.

2. The Upper Concentration Limit in Soil shall be equal to ten times the highest soil standard calculated at 310 CMR 40.0984, or 10,000 µg/g, whichever is lower.

(c) For the following oil and/or hazardous material, the Upper Concentration Limits in Soil and Groundwater are not applicable. As a result, the comparison of site concentrations to Upper Concentration Limits pursuant to 310 CMR 40.0996(3) is not required, and the need for an Activity and use Limitation shall not be determined by comparison to an Upper Concentration Limit in Soil, as described in 310 CMR 40.1012(2)(a)3. and 310 CMR 40.1012(3)(b).

1. asbestos

40.1003: General Provisions for Response Action Outcomes

...

(5) A Class A or Class B Response Action Outcome shall not be achieved unless and until each source of oil and/or hazardous material which is resulting or is likely to result in an increase in concentrations of oil and/or hazardous material in an environmental medium, either as a consequence of a direct discharge or through intermedia transfer of oil and/or hazardous material, is eliminated or controlled.

(a) Such sources may include, without limitation:

1. leaking storage tanks, vessels, drums and other containers;
2. dry wells or wastewater disposal systems which are not in compliance with regulations governing discharges from those systems;
3. contaminated fill, soil, sediment and waste deposits; and

4. non-aqueous phase liquids.

(b) For the purposes of 310 CMR 40.1003(5), the presence of Releasable Asbestos Containing Debris in accessible soil is defined to be a source to ambient air.

(~~cb~~) For the purposes of 310 CMR 40.1003(5), the downgradient leading edge of a plume of oil and/or hazardous material dissolved in and migrating with groundwater shall not, in and of itself, be considered a source of oil and/or hazardous material.

## **Proposed Amendment to 310 CMR 7.15**

### **For Asbestos in Soil Remediated Under the MCP**

#### **7.15: U Asbestos**

(1) Standards for Demolition/Renovation

(a) **Applicability.** No person shall cause, suffer, allow, or permit the demolition/renovation, installation, reinstallation, handling, transporting, storage, or disposal of a facility or facility component that contains asbestos, asbestos-containing material, or asbestos-containing waste material in a manner which causes or contributes to a condition of air pollution.

(b) **Notification.** Each owner/operator of a demolition/renovation operation involving asbestos-containing material shall:

1. Provide the Department with all information required on a Department-approved form with respect to the intended demolition/ renovation operation of a facility or facility component. A waiver to the notification provisions contained in 310 CMR 7.15(1)(b)2.a. and b., may be granted by the Department in the case of an emergency.
2. Postmark or deliver all required information to the applicable Department regional office:
  - a. at least ten working days before a demolition/renovation operation begins, or
  - b. within one working day prior to the beginning of an emergency demolition/renovation operation unless a waiver is granted by the Department, or if less than one working day, notification shall be made initially by telephone with written follow-up, or
  - c. where an owner/operator receives written Department approval of a planned demolition/renovation operation occurring during a 12 month period, provide revised information as required by the Department in writing, and a monthly report of updated information for actual work performed.
3. Include but not be limited to the following information on the Department-approved form:
  - a. Name, address, and telephone number of the facility owner, operation manager, if any, contractor, and subcontractor, if any, contractor's or subcontractor's Massachusetts asbestos removal certification and licensing number, if any;
  - b. Description of the facility being demolished and renovated, including the address, worksite location or locations as described in 7.15(1)(b)2.c., size, age, and prior and current use of the facility;

- c. Estimate amount (in lineal feet or square feet) of the approximate amount of asbestos-containing materials to be handled under this application with a description of the techniques used for the estimation;
  - d. Scheduled start-up and completion dates of the demolition/renovation operation, transportation, storage at a refuse transfer station facility (if applicable), and disposal at a sanitary landfill site of the asbestos-containing waste material; if the demolition/renovation start-up or completion date changes or is cancelled ensure that notification is made in writing at least one working day prior to the originally-scheduled start date of the operation;
  - e. Description of proposed demolition/renovation operation and procedures to be used;
  - f. Name, address, and telephone number of the transporter company(s) responsible for transporting asbestos-containing waste material from the demolition/renovation site to storage site, if any, and to final disposal site;
  - g. Name, address, and telephone number of the refuse transfer station facility and owner responsible for storing the asbestos-containing waste material prior to final transport and disposal at a sanitary landfill site;
  - h. Name, address, and telephone number of the sanitary landfill facility and owner where the asbestos-containing waste material will be disposed;
  - i. For a facility described as an emergency demolition/renovation operation, the name, title, and authority of the state or local government official who evaluated the emergency and ordered the operation;
  - j. Date and signature of the facility owner/operator or facility owner's designee and date and signature of the contractor.
4. Separate notification will be required, except as to 310 CMR 7.15(1)(b)2.c., when:
- a. ~~a.~~—demolition/renovations are scheduled for widely-spaced geographical locations on the same facility;
  - b. demolition/renovations are scheduled for a single facility, but are separated by a time period of greater than one week; or
  - c. when a demolition/renovation is postponed more than 30 days from the date on the initial notification.
5. Notwithstanding the requirements of 310 CMR 7.15 (b) (1-4), management of debris containing asbestos at a disposal site for which response actions are being conducted pursuant to MGL c.



21E and 310 CMR 40.0000 (the Massachusetts Contingency Plan) does not require notification pursuant to this section.

- (c) **Procedures for Asbestos Emission Control.** Each owner/operator shall comply with the following procedures to prevent visible or particulate emissions to the ambient air space:
1. Remove any asbestos-containing material from a facility or facility component prior to demolition/renovation operations if such operations will cause asbestos emissions, or will render the asbestos-containing material friable, or will prevent access to the asbestos-containing material for subsequent containment and removal;
  2. When a facility component covered or coated with asbestos-containing material is being removed as units or in sections:
    - a. Adequately wet asbestos-containing material exposed during the removal operations;
    - b. Lower the units or sections to the ground level so as to not cause airborne emissions of asbestos; and
    - c. Ensure no release of asbestos to the ambient air space during removal of asbestos from these units or sections handled so as to ensure:
      - i. maintaining adequate wetness of the asbestos-containing material, and
      - ii. sealing the work area and using a local exhaust ventilation and collection system designed and operated to capture particulate asbestos material. This system must exhibit no visible or particulate emissions to the outside air and be designed and operated in accordance with the requirements of 7.15(1)(d), Air Cleaning;
  3. When asbestos-containing material is being removed from a facility component the following procedures shall be performed:
    - a. Ensure that such material is adequately wet;
    - b. Contain the material *in situ* of the facility component;
    - c. Lower the contained material carefully to the ground so as to prevent emissions;
    - d. Ensure no release of asbestos emissions by methods of capture and containment of fugitive dust such as work area seal and air cleaning, as described in 310 CMR 7.15.
  4. Once the asbestos-containing material have been removed and wetted, ensure that the material remains wet until and after it is sealed into a container for disposal.
- (d) **Air Cleaning.** The owner/operator using air cleaning at a facility shall properly install, use, operate, and maintain all air-cleaning equipment authorized by 310 CMR 7.15(1)(d). Bypass

devices may be used only during upset or emergency conditions and then only for so long as it takes to shut down the operation generating the particulate asbestos-containing material. Each owner/operator shall use one of the following air cleaning systems or their equal:

1. Use fabric filter collection devices and perform the following:
    - a. operate the fabric filter collection devices at a pressure drop of no more than four inches water gauge, as measured across the filter fabric;
    - b. ensure that the air flow permeability, as determined by ASTM Method D737-75, does not exceed 350 ft<sup>3</sup>/min/ft<sup>2</sup> for felted fabrics;
    - c. ensure that felted fabric weighs at least 14 ounces per square yard and is at least 1/16 inch thick throughout; and
    - d. avoid the use of synthetic fabrics that contain fill yarn other than that which is spun; or
  2. Use portable, high efficiency particulate air (HEPA) filtered power exhaust units equipped with negative air pressure systems with operational alarm system capable of indicating the unit is working properly, and utilizing a clean filter specified for the unit and capable of filtering 0.3 micron particles with 99.97% efficiency; or
  3. In the event that the use of an air cleaning system causes a fire or explosion hazard, the Department may authorize as a substitute
    - a. the use of wet collectors designed to operate with a unit contracting energy of at least 40 inches water gauge pressure; or
    - b. the use of filtering equipment other than that described in 310 CMR 7.15, if the owner/operator demonstrates to the Department's satisfaction that it is as efficient in filtering particulate asbestos material.
- (e) **Waste Disposal.** Each owner/operator shall:
1. Discharge no visible or particulate emissions to the ambient air during the collection, processing, packaging, transporting, transferring, or disposing of any asbestos-containing waste material, and use the disposal methods specified in 310 CMR 7.15(1)(e) such that the asbestos-containing material is non-friable;
    - a. adequately wet asbestos-containing waste material obtained from air cleaning equipment or from removal operations and, while wet, containerize and seal the asbestos-containing waste material in leak-tight containers, labeled

**CAUTION**

Contains Asbestos

Avoid Opening or

Breaking Container

Breathing Asbestos is Hazardous  
to your Health

or, use warning labels specified by Occupational Safety and Health Standards of the Department of Labor, Occupational Safety and Health Administration (OSHA), or

b. process asbestos-containing waste material into non-friable form such as pellets or other shapes; or

c. use an alternative processing method that has received prior approval by the Department.

2. Store at an approved refuse transfer station facility (if applicable) in accordance with [310 CMR 18.00](#) requirements for storage of special waste.

3. Dispose of asbestos-containing waste material at an approved sanitary landfill special waste site. If within Massachusetts, such sites must be operated in accordance with [310 CMR 19.00](#). Outside Massachusetts, such sites must be operated in accordance with applicable state and federal asbestos laws.

(f) **Spraying.** No owner/operator of a facility shall spray on any facility or facility component any asbestos-containing material.

(g) **Insulating Material.** No owner/operator of a facility may install or reinstall on a facility or facility component asbestos-containing insulating materia<sup>1</sup>.

(2) **Enforcement Provisions.** 310 CMR 7.15 is subject to the enforcement provisions in [310 CMR 7.52](#), except as to 310 CMR 7.15(1)(b).

**DRAFT**  
**BEST MANAGEMENT PRACTICES**  
**BULK LOADING OF ACM SOIL/DEBRIS**

1. Conduct perimeter air sampling on all four sides of the work area during all active handling operations (unless containment is used):
  - a. Use phase contrast microscopy (PCM) to analyze a minimum of 8 air monitoring samples per 8-hour shift, and perform PCM analysis on-site to obtain real-time data (maintain data on-site). On 10% of samples, use transmission electron microscopy (TEM) to verify PCM results.
  - b. Stop work and notify BWP if fiber levels exceed 0.01 fibers/cc.
  - c. If containment is used for handling, collect and analyze clearance air monitoring samples prior to breaking down or moving containment.
  - d. Use a DOS certified Asbestos Project Monitor contracted by the owner/operator to take air monitoring samples and ensure compliance of the asbestos project.
2. Loading Operations
  - a. Use wet methods during any excavation, handling and loading of all ACM soils so that no dust is generated.
  - b. Screening of soil which contains ACM to remove debris must take place in a negative-pressure contained work area using air cleaning.
  - c. Clearly delineate (e.g., identify and mark) routes from loading area to equipment decontamination area to avoid contamination spread.
  - d. Use live loading into trucks or containers and avoid stockpiling of soil (i.e., to limit number of times soil is handled).
  - e. Prevent visible emissions during all operations.
  - f. To the extent feasible, use loading machinery that creates the least amount of soil disturbance (e.g., excavator is preferable to a vacuum loader) and facilitates decontamination (e.g., tire vehicles are preferable to tracked vehicles).
  - g. If a vacuum loader is used, the material outlet / loading operations must be conducted under negative-pressure containment.
3. Packaging
  - a. Line containers or trucks with two 10 millimeter thick pre-formed polyethylene liners (do not use roll poly). Polyethylene liners should be designed and sized for the container to be used and should be folded over sides of trailers or containers to protect against contamination during loading and to facilitate decontamination.
  - b. After loading, seal both liners separately.
  - c. For containers of asbestos containing waste, place asbestos danger label and generator label on top of sealed liner; place 2212 orange rectangle or DOT placard on all four sides of the container or vehicle being used.
4. Decontamination
  - a. Use 3-stage personnel decontamination as appropriate.
  - b. Use an equipment decontamination area and ensure that decontamination pad for equipment is constructed to withstand use weight of equipment, frequency of use,

- length of the job, etc. (e.g., multi-layer, with materials such as stone, EPDM-rubber roofing, hay bales, filters and pumps).
- c. Prior to disposal, collect and filter all water used in the decontamination process using a 5 micron filter.
  - d. Clean the decontamination area as needed and at least at the end of every shift
  - e. Waste resulting from the breakdown of personnel and equipment decontamination should be handled as asbestos containing waste material and should be packaged and disposed of accordingly.
5. Personal protective equipment
- a. Follow 453 CMR 6.00 Worker Protection Requirements and OSHA standards at 29 CFR Part 1926.1101.
6. Training/certifications
- a. Follow 453 CMR 6.00 Training and Certification Requirements.